

**Notice of Allowability**

Application No.

09/484,742

Examiner

Michael Pyzocha

Applicant(s)

RHOADS, GEOFFREY B.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 05/09/2005.
2. ☒ The allowed claim(s) is/are 27-70.
3. ☒ The drawings filed on 18 January 2000 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 01212005
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
**ANDREW CALDWELL**  
**SUPERVISORY PATENT EXAMINER**

**DETAILED ACTION**

1. Claims 27-83 are pending.
2. Amendment filed 05/09/2005 has been received and considered.

***Election/Restrictions***

3. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 27-70, drawn to masking information in a signal, classified in class 380, subclass 252.
- II. Claims 71-81, drawn to encoding data into audio by scaling audio characteristics, classified in class 713, subclass 200.
- III. Claims 82-83, drawn to steganographically encoding auxiliary bits into compressed audio, classified in class 713, subclass 176.

The inventions are distinct, each from the other because of the following reasons:

4. Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has

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separate utility such as encoding bits without the specific scaling of invention II. See MPEP § 806.05(d).

5. Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has separate utility such as encoding bits into the signal before it is compressed. See MPEP § 806.05(d).

6. Inventions II and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as encoding bits into the signal before it is compressed. See MPEP § 806.05(d).

7. Because these inventions are distinct for the reasons given above, would require a different search and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

8. Applicant's election without traverse of Group I by phone on 05/25/2005.

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***Information Disclosure Statement***

9. The information disclosure statement (IDS) submitted on 01/21/2005 has been considered by the examiner.

***Specification***

10. The objection to the specification has been withdrawn.

***Claim Rejections - 35 USC § 103***

11. The rejection of claim 50 under 35 USC 103 has been withdrawn based on the submitted arguments.

***Response to Arguments***

12. Applicant's arguments, filed 05/09/2005, with respect to claim 50 have been fully considered and are persuasive. The rejection of claim 50 has been withdrawn.

13. Applicant's arguments with respect to claims 71-83 have been considered but are moot in view of the Examiner's amendment below.

**EXAMINER'S AMENDMENT**

14. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure

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consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with William Conwell on 05/25/2005.

The application has been amended as follows:

In the Claims:

1-26. (Canceled)

27. (Previously Presented) A method of embedding multi-bit auxiliary data into an input audio signal that is thereafter compressed to yield a compressed signal, and thereafter discerning the multi-bit auxiliary data from a non-identical counterpart to said audio signal obtained by decompressing the compressed signal, the method comprising:

providing an input audio signal representing a plurality of sequential series of audio data, each series comprising a plurality of samples, each sample having a value associated therewith;

for each of a plurality of samples in a series, transforming the value thereof in accordance with at least some of said multi-bit auxiliary data, wherein an encoded series of audio data is produced having the auxiliary data embedded therein;

repeating the foregoing transformation for a plurality of different series of said audio signal, thereby yielding a first encoded audio signal in which the auxiliary data is redundantly encoded through different temporal excerpts thereof;

compressing the first encoded audio signal;

decompressing the compressed, first encoded audio signal to produce a second encoded audio signal, said second encoded audio signal being non-identical to the first due to said compression/ decompression process; and

discerning the multi-bit auxiliary data from the second encoded audio signal without reference to the input audio signal.

28. (Previously Presented) The method of claim 27 in which the discerning includes processing a plurality of series of said second encoded audio signal to determine the auxiliary multi-bit data embedded therein, wherein greater or lesser confidence in the auxiliary multi-bit data discerned from said second encoded audio signal can be obtained by processing more or less series, respectively.

29. (Previously Presented) The method of claim 28 which includes performing said processing by a hardware decoding circuit.

30. (Previously Presented) The method of claim 29 which includes disabling recording capability of an apparatus based on the discerned auxiliary multi-bit data.

31. (Previously Presented) The method of claim 29 which includes incrementing a program specific billing meter based on the discerned auxiliary multi-bit data.

32. (Previously Presented) The method of claim 27 which includes:  
after the compressing, storing said compressed, first encoded audio signal on an optically encoded storage disk; and  
prior to said decompressing, reading said compressed, first encoded audio signal from said optically encoded storage disk.

33. (Previously Presented) The method of claim 27 which includes converting the second encoded audio signal to analog form, and thereafter discerning the multi-bit auxiliary data therefrom.

34. (Previously Presented) The method of claim 33 which includes digitizing the analog form of the second encoded audio signal to produce a digitized signal, and discerning the multi-bit auxiliary data from said digitized signal.

35. (Previously Presented) The method of claim 27 in which the transformations occur in a time domain, rather than some occurring in a transformed, frequency domain.

36. (Previously Presented) The method of claim 27 in which the transforming includes also processing the value of said plurality of samples in accordance with samples of a pseudo-random noise signal.

37. (Previously Presented) The method of claim 27 wherein a plurality of samples in the first encoded audio signal are each encoded in accordance with more than one bit of said auxiliary data, wherein single samples are each encoded in accordance with multiple bits.

38. (Previously Presented) The method of claim 27 wherein a plurality of samples in the first encoded audio signal are each encoded in accordance with no more than one bit of said auxiliary data, wherein single samples are each encoded in accordance with single bits.

39. (Previously Presented) A method of decoding an encoded audio signal to extract a multi-bit auxiliary data signal therefrom, the encoded audio signal comprising plural sequential series of audio data, each series comprising a plurality of samples, each sample having a value associated therewith, the multi-bit auxiliary data signal being steganographically encoded in each of several of the series, the multi-bit auxiliary data signal being generally imperceptible to human listeners of the encoded audio signal, encoding comprising slight changes to portions of an original audio signal to thereby represent said multi-bit auxiliary data signal, the method further including:

    computing parameters related to entropies of first and second signals, the first of said signals being an altered version of said encoded audio signal; and

    comparing the computed parameters to discern a value of at least one bit of said multi-bit auxiliary data signal.

40. (Previously Presented) The method of claim 39 in which the second of said signals is the encoded audio signal.

41. (Previously Presented) A method of decoding an encoded audio signal to extract a multi-bit auxiliary data signal therefrom, the encoded audio signal comprising plural sequential series of audio data, each series comprising a plurality of samples, each sample having a value associated therewith, the multi-bit auxiliary data signal being steganographically encoded in each of several of the series, the multi-bit auxiliary data



signal being generally imperceptible to human listeners of the encoded audio signal, encoding comprising slight changes to portions of said audio signal to thereby represent said multi-bit auxiliary data signal, the method further including processing an encoded audio signal corresponding to a plurality of series to extract said multi-bit auxiliary data signal therefrom, wherein greater or lesser confidence in the extracted multi-bit auxiliary data signal can be obtained by processing more or less series of the encoded audio signal, respectively.

42. (Previously Presented) The method of claim 41 in which said decoding includes statistically analyzing the encoded audio signal to discern the auxiliary data signal encoded therein.

43. (Previously Presented) The method of claim 41 which further includes disabling a recording capability of an associated apparatus based on at least a portion of said extracted multi-bit auxiliary data signal.

44. (Previously Presented) The method of claim 41 which includes reading said encoded audio signal from an optically encoded storage disk on which it was stored in lossy compressed form, and decompressing same prior to said decoding.

45. (Previously Presented) The method of claim 44 which includes converting said audio signal to analog form prior to said decoding.

46. (Previously Presented) The method of claim 41 in which said decoding is accomplished in a time domain.

47. (Previously Presented) A method of decoding an encoded audio signal to extract a multi-bit auxiliary data signal therefrom, the encoded audio signal comprising plural sequential series of audio data, each series comprising a plurality of samples, each sample having a value associated therewith, the multi-bit auxiliary data signal being steganographically encoded in each of several of the series, the multi-bit auxiliary data

signal being generally imperceptible to human listeners of the encoded audio signal, encoding comprising slight changes to portions of an original audio signal to thereby represent said multi-bit auxiliary data signal, the method further including computing a dot product between a representation of the encoded audio and reference data for each of several different series, combining these dot products, comparing an outcome of the combined dot product with a threshold, and discerning a value of at least a part of said multi-bit auxiliary data based on the comparison.

48. (Previously Presented) A method of decoding an encoded audio signal to extract a multi-bit auxiliary data signal therefrom, the encoded audio signal comprising plural sequential series of audio data, each series comprising a plurality of samples, each sample having a value associated therewith, the multi-bit auxiliary data signal being steganographically encoded in each of several of the series, the multi-bit auxiliary data signal being generally imperceptible to human listeners of the encoded audio signal, encoding comprising slight changes to portions of said audio signal to thereby represent said multi-bit auxiliary data signal, the method further including processing the encoded audio signal with a pseudo-random key signal to de-randomize the multi-bit auxiliary data signal steganographically encoded therein.

49. (Previously Presented) The method of claim 48 which includes evaluating whether copying of the encoded audio signal is permitted, based on the decoded auxiliary data signal.

50. (Currently Amended) A method of decoding an encoded audio signal to extract a multi-bit auxiliary data signal therefrom, the encoded audio signal comprising plural sequential series of audio data, each series comprising a plurality of samples, each sample having a value associated therewith, the multi-bit auxiliary data signal being steganographically encoded in each of several of the series, the multi-bit auxiliary data signal being generally imperceptible to human listeners of the encoded audio signal, the encoding comprising slight changes to portions of said audio signal to thereby represent said multi-bit auxiliary data signal, the method further including applying the encoded

audio signal to a matched filter processing unit, applying a reference signal to said matched filter processing unit, and processing a plurality of series of said encoded audio signal with said processing unit to extract the multi-bit auxiliary data signal therefrom.

51. (Previously Presented) The method of claim 47 in which the decoding includes processing a plurality of series of said encoded audio data to extract the auxiliary multi-bit data encoded therein, wherein greater or lesser confidence in the auxiliary multi-bit data is obtained by processing more or less series, respectively.

52. (Previously Presented) The method of claim 51 which further includes disabling recording capability of an associated audio apparatus based on the extracted auxiliary data.

53. (Previously Presented) The method of claim 47 in which said decoding includes statistically analyzing the encoded audio to discern the auxiliary data encoded therein.

54. (Previously Presented) The method of claim 47 which further includes disabling recording capability of an associated audio apparatus based on the extracted auxiliary data.

55. (Previously Presented) The method of claim 54 which further includes disabling recording capability of the associated audio apparatus based on part of said extracted auxiliary data, other of said extracted auxiliary data serving a purpose unrelated to disabling a recording capability.

56. (Previously Presented) The method of claim 47 which includes reading said encoded audio from an optically encoded storage disk prior to said decoding.

57. (Previously Presented) The method of claim 56 in which said encoded audio is stored on the optically encoded storage disk in a compressed form that leads to data loss from the encoded audio.

58. (Previously Presented) The method of claim 57 which further includes disabling recording capability of an associated audio apparatus based on the auxiliary data extracted from said encoded audio notwithstanding said data loss.

59. (Previously Presented) The method of claim 47 in which said decoding is accomplished in a time domain.

60. (Previously Presented) The method of claim 47 which further includes processing the encoded audio with a pseudo-random key signal in decoding the multi-bit auxiliary data steganographically encoded therein.

61. (Previously Presented) The method of claim 60 which includes evaluating whether copying of the encoded audio is permitted, based on the decoded auxiliary data.

62. (Previously Presented) The method of claim 47 in which said dot product is performed by a matched filter processing unit.

63. (Previously Presented) The method of claim 62 which includes processing plural series of said encoded audio with said processing unit to extract the multi-bit auxiliary data therefrom.

64. (Previously Presented) The method of claim 47 in which said decoding does not yield a final multi-bit auxiliary data until plural series have been processed.

65. (Previously Presented) A method of decoding an encoded audio signal to extract a multi-bit auxiliary data signal therefrom, the encoded audio signal comprising plural sequential series of audio data, each series comprising a plurality of samples, each

sample having a value associated therewith, the multi-bit auxiliary data signal being steganographically encoded in each of several of the series, the multi-bit auxiliary data signal being generally imperceptible to human listeners of the encoded audio signal, encoding comprising slight changes to portions of an original audio signal to thereby represent said multi-bit auxiliary data signal, the method further including, for a first series, performing one or more dot product operations between a representation of a series and reference data, repeating said dot product operations for each of one or more additional series, combining the dot products thus produced, discerning at least part of the multi-bit auxiliary data from the combined dot products, and determining whether to disable recording capability of an associated audio apparatus based on discerned data.

66. (Previously Presented) The method of claim 65 which further includes determining whether to disable the recording capability of the associated audio apparatus based on part of the discerned auxiliary data, other of said discerned auxiliary data serving a purpose unrelated to disabling a recording capability.

67. (Previously Presented) The method of claim 65 which includes reading said encoded audio from an optically encoded storage disk prior to said decoding, said encoded audio being stored on the disk in a compressed form that leads to data loss from the encoded audio, wherein the auxiliary data is discerned notwithstanding such data loss.

68. (Previously Presented) A method of embedding plural-bit auxiliary data into an audio signal that is thereafter compressed to yield a compressed audio signal, and thereafter discerning the plural-bit auxiliary data from a non-identical counterpart to a signal obtained by decompressing the compressed audio signal, the method comprising:

providing an input audio signal comprising a plurality of samples, each sample comprising eight or more bits, said bits defining a sample value;

for each of a plurality of samples, transforming the value thereof in accordance with at least some of the plural-bit auxiliary data, wherein a first encoded audio signal is produced having the auxiliary data embedded therein;

compressing the first encoded audio signal;

decompressing the compressed, first encoded audio signal to produce a second encoded audio signal, said second encoded audio signal being non-identical to the first encoded audio signal due to said compression and decompression; and

discerning the plural-bit auxiliary data from the second encoded audio signal;  
wherein the transforming comprises adding an overlay signal to the audio signal.

69. (Previously Presented) In a method of decoding encoded content to extract multi-bit auxiliary data therefrom, the encoded content representing audio or video and including plural portions, the multi-bit auxiliary data being steganographically encoded therein, the multi-bit auxiliary data thus being generally imperceptible to human consumers of the content, encoding comprising slight changes to portions of the content to thereby represent multi-bit auxiliary data, an improvement comprising:

computing parameters related to the entropies of first and second signals, the first of said signals being an altered version of the encoded content; and

comparing the computed parameters to discern the value of at least one bit of the multi-bit auxiliary data.

70. (Previously Presented) In a method of decoding encoded content to extract multi-bit auxiliary data therefrom, the encoded content representing audio or video and including plural portions, the multi-bit auxiliary data being steganographically encoded therein, the multi-bit auxiliary data thus being generally imperceptible to human consumers of the content, encoding comprising slight changes to portions of the content to thereby represent the multi-bit auxiliary data, an improvement comprising computing a dot product between a representation of the encoded content and reference data for each of several different portions of the content, combining these dot products, comparing an outcome of the combined dot product with a threshold, and discerning the value of at least a part of the multi-bit auxiliary data based on said comparison.

71-83. (Canceled)

***Allowable Subject Matter***

The following is an examiner's statement of reasons for allowance: Claims 26-49 and 51-70 are allowed for the reasons put forth in previous action. Applicant's arguments with regard to claim 50 have been considered and are persuasive and therefore the rejection of claim 50 under 35 USC 103 has been withdrawn.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Pyzocha whose telephone number is (571) 272-3875. The examiner can normally be reached on 7:00am - 4:30pm first Fridays of the bi-week off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571) 272-3868. The fax phone number for the

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organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJP



**ANDREW CALDWELL**  
**SUPERVISORY PATENT EXAMINER**